

WHAT IS CLAIMED IS:

1. A flow-measurement apparatus comprising:
a housing containing an auxiliary gas passage through
5 which a part of gas flowing in a main gas passage passes;
a sensor element situated in said auxiliary passage;
and
thin films covering a part or the whole of surfaces
of said housing;
10 wherein the emissivity of said thin film is smaller
than that of members composing said housing.
2. A flow-measurement apparatus according to claim 1,
wherein said thin films are made of metal.
- 15 3. A flow-measurement apparatus according to claim 2,
wherein said metal thin films are formed by one of a plating
method, an evaporation method, and a sputtering method.
- 20 4. A flow-measurement apparatus according to claim 2,
wherein an average thickness of said respective metal thin
films is less than 0.1 mm.
5. A flow-measurement apparatus according to claim 2,
25 wherein each metal thin film is made of a plurality of flakes

which are partially or totally connected to, or disconnected from each other.

6. A flow-measurement apparatus according to claim 2,
5 wherein a main component of said metal contains at least one of nickel, gold, copper, aluminum, palladium, platinum, silver, and zinc.

7. A flow-measurement apparatus according to claim 1,
10 wherein said thin films are formed on outer surfaces of said housing, which are parallel with the axis of said main gas passage, and are opposite to each other.

8. A flow detection element comprising:
15 a resistor formed on one of surfaces of a substrate, which generates heat by current flowing in said resistor;
a glass layer covering said resistor;
a metal film formed on said glass layer or another surface of said substrate.

20

9. A flow detection element according to claim 8, wherein said resistor has a conductor extending to one side of said substrate, and said metal film has not a conductor extending to said side of said substrate.

25

10. A flow-measurement apparatus comprising:

a housing containing an auxiliary gas passage through which a part of gas flowing in a main gas passage, whose wall is made of resin, passes;

5 a sensor element situated in said auxiliary passage;
and

a metal thin film covering a part or the whole of the inside surface of said wall of said main gas passage.

10 11. A flow-measurement apparatus comprising:

a housing containing an auxiliary gas passage through which a part of gas flowing in a main gas passage;

a sensor element situated in said auxiliary passage;
and

15 a metal thin film covering a part or the whole of the inside surface of said main gas passage;

wherein the emissivity of said metal thin film is smaller than that of members composing said housing.

20 12. A flow-measurement apparatus comprising:

a housing containing an auxiliary gas passage through which a part of gas flowing in a main gas passage passes;

a sensor element situated in said auxiliary passage;
and

25 plates situated on outer surfaces of said housing via

respective gaps.

13. A flow-measurement apparatus according to claim 12,
wherein said plates are made of metal or material whose
5 emissivity is smaller than that of said members composing
said housing.

14. A flow-measurement apparatus according to claim 12,
wherein said plates are situated in parallel with the axis
10 of said main gas passage.

15. A flow-measurement apparatus comprising:
a housing containing an auxiliary gas passage through
which a part of gas flowing in a main gas passage;
15 a sensor element situated in said auxiliary passage;
and
resin skirts situated at both sides of said housing
via respective gaps, said sides being in parallel with the
axis of said main gas passage.

20

16. A flow-measurement apparatus comprising:
a housing containing an auxiliary gas passage through
which a part of gas flowing in a main gas passage passes;
a sensor element situated in said auxiliary passage;
25 and

metal thin films covering a part or the whole of surfaces of said housing.

17. A physical quantity-detecting apparatus for an engine,
5 said apparatus comprising:

a resin housing having a gas introducing portion which is opened to a main gas passage;

a detector element for detecting a physical quantity of gas passing through said fluid introducing portion; and

10 metal thin films covering a part or the whole of surfaces of said housing.

18. A physical quantity-detecting apparatus for an engine, said apparatus comprising:

15 a resin housing having a gas introducing portion which is opened to a main gas passage;

a detector element for detecting a physical quantity of gas passing through said fluid introducing portion; and

20 thin films covering a part or the whole of surfaces of said housing;

wherein the emissivity of said thin films is smaller than that of members composing said housing.

19. A physical quantity-detecting apparatus for an engine
25 according to claim 18, wherein said thin films are made of

metal.

20. A physical quantity-detecting apparatus for an engine according to claim 18, wherein said physical quantity is one
5 of flow rate, temperature, pressure, and a component of said gas.

21. A physical quantity-detecting apparatus for an engine according to claim 18, wherein said main gas passage is one
10 of an air-intake pipe, a gas-exhaust pipe, a bypass passage of said air-intake pipe, and a bypass passage of said gas-exhaust pipe.

22. A physical quantity-detecting apparatus for an engine
15 according to claim 19, wherein said metal thin films are formed by one of a plating method, an evaporation method, and a sputtering method.

23. A physical quantity-detecting apparatus for an engine
20 according to claim 19, wherein an average thickness of said respective metal thin films is less than 0.1 mm.

24. A physical quantity-detecting apparatus for an engine according to claim 19, wherein each metal thin film is made
25 of a plurality of flakes, which are partially or totally

connected to, or disconnected from each other.

25. A physical quantity-detecting apparatus for an engine according to any one of claims 15 - 20, wherein a main
5 component of said metal thin films contains at least one of nickel, gold, copper, aluminum, palladium, platinum, silver, and zinc.

26. A physical quantity-detecting apparatus for an engine
10 according to claim 18, wherein said thin films are formed on outer surfaces of said housing, which are parallel with the axis of said main gas passage, and are opposite to each other.

15 27. An engine system comprising:
an engine;
a flow-measurement apparatus according to any one of claims 1, 8, 10, 11, 12, 15, and 16;
fuel-feed means for feeding fuel to said engine; and
20 control means for controlling said fuel-feed means based on an output signal of said flow-measurement apparatus;
wherein a main passage described in claims 1, 8, 10, 11, 12, 15, and 16, is one of an air-intake pipe and a bypass passage of said air-intake pipe in said engine.

28. An engine system comprising:

an engine;

a physical quantity-detecting apparatus for an engine
according to any one of claims 17 and 18;

5 fuel-feed means for feeding fuel to said engine; and
control means for controlling said fuel-feed means
based on an output signal of said physical quantity-detecting
apparatus for an engine;

wherein a main passage described in claims 17 and 18,
10 is one of an air-intake pipe, a gas-exhaust pipe, a bypass
passage of said air-intake pipe, and a bypass of said
gas-exhaust pipe in said engine.